FIGS. 17*i* and 17*h* illustrate a rotation command about arbitrary single axis. In FIG. 17*g*, the user generates a rotation command about z' axis, where z' is shifted an angle of phi from the z axis. The trajectory profile (r, theta) illustrated in FIG. 17*j* is similar to that of FIGS. 17*f* and 17*h*, however the value of angle theta is shifted 90+phi.

Finally, an arbitrary trajectory is illustrated in FIG. 17*k* and the corresponding CCD image is illustrated in FIG. 17*i*. FIG. 17*k* illustrates simultaneous rotation commands about x axis, y axis and z axis. In this case, both coordinates (r, theta) of the touch point changes continuously.

Alternatively, the light source and semi-transparent panels can be made of infrared light emitting diodes (IR LED) and long pass glass filters, which reflect most visible light but allow transmission of infrared. FIG. 19 illustrates a 6 degree-of-freedom controller **2000** including an opaque enclosure **2010**, a compact infrared-sensitive camera **2020**, infrared LEDs **2030** an infrared light source frames **2029** and a three long pass glass filters **2040**, **2050**, and **2060**. Force-sensors **2060** are optionally mounted between filters **2040**, **2050** and **2060** and enclosure **2010** to detect forces on the filters. Visible light reflects from filters **2040**, **2050**, and **2060**. However, infrared light, such as that from LEDs **2030**, is transmitted through the filters. Infrared LEDs **2030** surround each filter to provide a uniform illumination on each filter. Thus, if the user touches a filter, such as filter **2040**, the touch spot blocks the transmission of infrared light and this touch point will be detected by camera **2020**. The operation of controller **2000** is similar to the operation of the white-light based systems described above with the advantage that the infrared-based controller **2000** is insensitive to ambient white light in the user's room which is a potential cause of error in the formation of the digitized "0" or "1")image.

Long-pass glass filters having a very low transmission in the shortwave region (i.e. visible light region) and high transmission in the longwave region (i.e. infrared light region) are commercially available. One such a filter, known as "black glass," is available from Rolyn Optics under stock number 65.1398 (stock number RG850.) This example has a transmission for visible light (390 nm–770 nm) of less than 10^{-3}%; a transmission of 50% at 850 nm; and a transmission of 97.5% at 900 nm. IR LEDs typically provide light in the 800 nm–1000 nm range with a peak intensity at 900 nm. Thus, stock number RG850 glass is ideally suited to differentiate ambient visible light from light generated by IR LEDs. The desired semi-transparent property of the long-pass filter is achieved by treatment of fine ground surface (single side) or a putting gray colored translucent film/sheet on the surface to provide the desired diffusion. Such a light diffusion sheet is distributed by Edmund Scientific Co., Barrington, N.J. under the LENSCREEN mark.

While the invention has been particularly taught and described with reference to the preferred embodiment, those versed in the art will appreciate that minor modifications in form and details may be made without departing from the spirit and scope of the invention. For example, the input control technique taught in association with FIGS. **11** and **12** could be used with input control devices other than rear screen video detection devices. For example, it could be used with a mouse or other input control device. As another example, the force sensitive pads as described in FIG. **10** could be used in the embodiment of FIG. **1**, so that panel **105** did not have to be force sensitive, but a force applied to panel **105** could still be detected. Again, while the preferred embodiment has been taught with reference to a compact CCD camera, other types of imaging devices such as CMOS area sensors, infrared focal area sensors, or other equivalent imaging sensing devices could be used. Accordingly, all such modifications are embodied within the scope of this patent as properly come within my contribution to the art and are particularly pointed out by the following claims.

I claim:

1. A method for providing graphical input signals from an input device for an interactive computer system using an opaque enclosure with multiple semi-transparent light-diffusing panels disposed to form outside surfaces of the enclosure and an imaging device mounted relative to the panels for imaging the panels, the method including the steps of:

touching an outside surface of one panel;

imaging an inner surface of the panels with the imaging device;

acquiring a background image of the panels before touching the one panel; p1 normalizing the image signal in response to the background image;

providing an image signal in response to the image;

determining the coordinates of the image of the touch on the panel; and

providing signals responsive to the coordinates to the interactive computer system.

2. A method as in claim **1** further comprising the step of digitizing the image signal into two values prior to determining the coordinates of the image of the touch on a panel.

3. A method as in claim **1** further comprising the step of tracking objects on the image of the panel.

4. A method for providing graphical input signals for an interactive computer system using an opaque enclosure with multiple semi-transparent light-diffusing panels and an imaging device disposed relative to the panels, the method including the steps of:

touching an outside surface of one panel;

imaging inner surfaces of the panels with the imaging device;

providing an image signal in response to an image of the inner surface of a panel;

acquiring a background image of the panels before touching the one panel;

normalizing the image signal in response to the background image;

determining the coordinates of the image of a touch on the panel;

transforming the coordinates into a three dimensional image in response to the coordinates; and

providing a signal_representative of the transformed coordinates.

5. A method as in claim **4** further comprising the step of digitizing the image signal into two values prior to determining the coordinates of the image of the touch on the panel.

6. A method as in claim **4** wherein the steps of providing an image signal, and determining coordinates and transforming the coordinates are continuously repeated, and further comprising the step of tracking objects on the image of the panel.

7. A method for providing graphical input signals from an input device for an interactive computer system using an opaque enclosure with a semi-transparent light-diffusing panel and an imaging device disposed relative to the panel, the method including the steps of:

touching an outside surface of the panel;

imaging an inner surface of the panel with the imaging device;